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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/583,748	05/31/2000	Kouichiro Kitagawa	43888-071	4145

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WASHINGTON, DC 20005-3096

EXAMINER

RIDLEY, BASIA ANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/583,748

Applicant(s)

KITAGAWA ET AL.

Examiner

Basia Ridley

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim(s) 4 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically claim(s) 4 recite(s) the limitation(s) "wherein activity of said reforming catalyst is recovered when a concentration of hydrogen gas becomes higher than a predetermined concentration". While the original specification discloses that activity of catalyst is recovered "when the concentration of hydrogen gas in the reformed gas has become not less than the predetermined concentration"(P9/L14-16) the specification does not disclose that said activity of is recovered when a concentration of hydrogen gas becomes higher than a predetermined concentration.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claim(s) 1-2 and 4 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (USP 4,855,267) in view of Sinfelt et al. (USP 3,839,194) or Adsetts (USP 3,926,584) or Apelian et al. (USP 5,393,717).

Art Unit: 1764

Regarding claim 1, Cheng discloses a fuel reforming apparatus comprising:

- reforming unit equipped with reforming catalyst (C1/L45-60);
- a heater for heating said reforming unit (C1/L45-60);
- a control unit for controlling the supply of raw material to said reforming catalyst on the basis of a predetermined condition and for controlling the supply of an inert gas or water to said reforming catalyst (C2/L45-50 & C1/L64-C2/L18);
- wherein when said reforming catalyst reaches a predetermined condition said control unit operates to stop said supply of said raw material to said reforming catalyst and to allow said inert gas or water to be supplied to said reforming catalyst while said reforming unit is being heated (C2/L45-50 & C1/L64-C2/L18).

While Cheng discloses that the regeneration step occurs when a predetermined condition occurs (C2/L45-50) the reference does not explicitly disclose that said occurrence comprises the catalyst reaching a predetermined temperature.

Since it was well known in the art at the time of the invention that, for endothermic reactions, there exists a temperature window at which the reaction occurs. Said reaction is started at lower end of said temperature window and as time on line elapses (an catalyst begins to deactivate) the operation temperature is increased towards the upper end of said temperature window to maintain desired catalyst activity. With maximum operating temperature being determined for each specific reaction by determining when rapid catalyst deactivation starts to occur (as evidenced, for example, by: C7/L10-26 of Apelian et al., C4/L32-36 of Adsetts, C2/L22-36 of Sinfelt et al.). Therefore, in view of this knowledge, it would have been obvious to one having ordinary skill in the art at the time the invention was made to monitor the

Art Unit: 1764

temperature of the catalyst of Cheng to determine when the optimum starting point is for the catalyst regeneration, as this known and tried method of ensuring balance between operation and catalyst regeneration cycles. Doing so would involve use of a known process for its intended use in a known environment to accomplish entirely expected result.

Regarding claims 2 and 4, Cheng discloses in view of Sinfelt et al. or Adsetts or Apelian et al. disclose all of the claim limitations as set forth above. Additionally Cheng discloses a fuel reforming apparatus further comprising:

- a recovering gas supply unit for supplying an inert gas or water vapor to said reforming unit, wherein activity of said reforming catalyst is recovered by heating said catalyst while supplying said inert gas or water vapor to said reforming unit (C1/L64-C2/L18);
- a sensor for detecting a concentration of hydrogen gas, wherein activity of said reforming catalyst is recovered when a concentration of hydrogen gas becomes higher than a predetermined concentration (C2/L41-62).

5. Claim(s) 5 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (USP 4,855,267) in view of Sinfelt et al. (USP 3,839,194) or Adsetts (USP 3,926,584) or Apelian et al. (USP 5,393,717), as applied to claim 1 above, and further in view of Okada et al. (USP 5,302,470).

Regarding claim 5, Cheng in view of Sinfelt et al. or Adsetts or Apelian et al. disclose all of the claim limitations as set forth above, but the references do not explicitly disclose said apparatus comprising a desulfurizer for removing a sulfide from raw materials.

Okada et al. teaches that it is desirable to remove even trace amounts of sulfur from the reformer feedstock for the purpose of extending life of the reforming catalyst (C1-C4).

Art Unit: 1764

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a desulfurizer for removing a sulfide from raw materials in the reformer of Cheng, as taught by Okada et al., for the purpose of improving system economics by allowing processing of various raw materials, even ones which include sulfur, and by increasing the time between required catalyst regenerations.

6. Claim(s) 6 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (USP 4,855,267) in view of Sinfelt et al. (USP 3,839,194) or Adsetts (USP 3,926,584) or Apelian et al. (USP 5,393,717), as applied to claim 1 above, and further in view of Villemin (USP 4,089,941).

Regarding claim 6, Cheng in view of Sinfelt et al. or Adsetts or Apelian et al. disclose all of the claim limitations as set forth above. Additionally, while the references do not explicitly disclose said reforming catalyst is being heated to a temperature in the range of 500 to 800°C, the specific temperatures of operation are not deemed to confer patentability to the instant apparatus claims, since neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Additionally the claimed temperatures are well within the limits of steam reforming temperatures recognized within the art, as evidenced by C1/L11-25 of Villemin, therefore to heat the reforming catalyst of Cheng to such temperatures would involve use of a known process conditions for their intended use in a known environment to accomplish entirely expected result.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

Art Unit: 1764

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Response to Arguments

8. Applicant's arguments filed on 25 July 2003 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (703) 305-5418. The examiner can normally be reached on Monday through Thursday, from 8:30 AM to 7:00 PM.

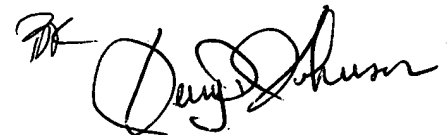
Art Unit: 1764

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (703) 308-6824.

The fax phone number for Group 1700 is (703) 872-9311 (for Official papers after Final), (703) 872-9310 (for other Official papers) and (703) 305-6078 (for Unofficial papers). When filing a fax in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are not for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Basia Ridley
Examiner
Art Unit 1764


JERRY D. JOHNSON
PRIMARY EXAMINER
GROUP 1100

BR
October 5, 2003